for laboratory analysis in the first and last days of the experiment, for counting oocysts per gram of feces (OOPG). Data were analyzed using the MIXED procedure of SAS and Tukey as post hoc tests for separation of means. Friedman nonparametric test was done for repeated analysis and count of OOPG. There was no difference between treatments for average daily gain (596 g/d for C and 656 g/d for T, $P > 0.05$). However, presence of OOPG was lower for cattle in the treatment group after 60 d when compared with samples from the beginning of the experiment ($P = 0.01$), which did not happen with the control group ($P = 0.86$). Results of this experiment suggest that toltrazuril 5% in the dose of 15 mg/kg can reduce parasite infestation in the gastrointestinal tract. Infestation in the beginning of the experiment was not deleterious enough to cause changes in average daily gain.

Table 1 (Abstr. 42). Effects of dosing 15 mg/kg of toltrazuril 5% to cattle

	Group			
Item	Control	Treatment	SEM	*P*-value
ADG, g/d[1]	596[a]	656[a]	247.67	NS
Oocysts per gram of feces, d 1	982.76[a,A]	988.89[a,B]	108.94	0.91
Oocysts per gram of feces, d 60	786.21[a,A]	730.56[a,A]	113.34	0.30

[a,b, A,B]Values with lowercase letters indicate differences between treatments; those with uppercase letters indicate difference between d 1 and 60 (Friedman nonparametric test).
[1]Tukey post hoc test.

Key Words: toltrazuril, coccidiosis, oocysts per gram of feces

M43 In vitro evaluation of the antimicrobial activity of plant extracts from *Ruta graveolens* and *Annona muricata*. Yadileiny Portilla[1], María Dolores Carro[2], Grethel Milián[1], Conrado Camacho[1], Aymara Valdivia[1], Alexey Díaz[3,4], Cristina Saro[3], Iván Mateos[3], and María José Ranilla*[3,4], *[1]Center for Biotechnological Studies, University of Matanzas, Matanzas, Cuba, [2]Agriculture Production Department. Technical University of Madrid, Madrid, Spain, [3]Animal Production Department. University of León, León, Spain, [4]4IGM (CSIC-ULE). Finca Marzanas s/n, Grulleros, León, Spa.*

Resistance of microorganisms to commercial drugs is increasing worldwide, and therefore the search for new antimicrobial agents is a key issue. The aim of this study was to identify the potential of plant extracts from *Ruta graveolens* and *Annona muricata* as candidates for the development of new antimicrobials. Plant extracts were obtained by the Soxhlet method and their biological evaluation was carried out by the agar diffusion method, with 4 doses assayed (6.25, 25, 50 and 100 mg/mL) and 4 replicates per dose. Eight bacterial strains from American Type Culture Collection (ATCC) were tested: *Escherichia coli* O157 (ATCC 43894), *Streptoccocus agalactiae* (ATCC 13813), *Salmonella enteritidis* (ATCC BBA664), *Enterobacter aerogenes (*ATCC 13048), *Staphylococcus aureus* (ATTC 13565), *Klebsiella pneumoniae* (ATCC 4352), *Proteus mirabilis* (ATCC 14153) and *Proteus vulgaris* (ATCC 9484). Extracts from both plants showed antibacterial activity against all bacteria tested, with the exception of *A. muricata* extract against *S. enteritidis*. Minimum inhibitory concentration for both extracts was 6.25 mg/mL for *E. aerogenes*, *S. agalactiae*, *S. aureus*, and *K. pneumoniae*, 25 mg/mL for *E. coli*, *P. mirabilis*, and *P. vulgaris*, and 50 mg/mL of *R. graveolens* for *Salmonella enteritidis*. There were no differences between extracts in their antibacterial activity against *P. vulgaris* ($P = 0.91$) and *K. pneumoniae* ($P = 0.37$), but *R. graveolens* extract showed greater ($P < 0.001$) antibacterial activity against *E. coli* and *S. agalactiae* than *A. muricata* extract, and a trend was also observed for *E. aerogenes* ($P = 0.064$). In contrast, *A. muricata* extract tended to have greater ($P = 0.094$) antibacterial activity against *P. mirabilis* compared with *R. graveolens* extract. The results suggest that these extracts have active ingredients that could help to develop new antimicrobial products for the improvement of animal production and health.

Key Words: *Ruta graveolens*, *Annona muricata*, gram-positive

M44 OmniGen-AF affects expression of immune-related genes in whole blood of healthy Angus heifers. S. A. Armstrong*[1,2], D. J. McLean[1], T. H. Schell[1,2], G. Bobe[2], and M. Bionaz[2], *[1]Phibro Animal Health, Corvallis, OR, [2]Department of Animal and Rangeland Sciences, Oregon State University, Corvallis, OR.*

Purebred Angus heifers were used to determine the effect of OmnniGen-AF (OG) supplementation on expression of cytokines, chemokines, and associated receptors involved in the inflammatory response in whole blood cells of healthy Angus heifers within the first 28 d of supplementation. Heifers were randomly assigned to control or supplemented daily with 56 g OG group (n = 4/group), and fed a diet including grass hay, alfalfa and ground corn. Heifers were housed in a freestall barn and fed via Calan Broadbent system. Blood was collected via jugular before the study started (0) and on d 3, 5, 10, 14, 21, and 28 of supplementation. The qRT-PCR was performed using the Cow Inflammatory Cytokines and Receptor qPCR array (Qiagen). Data were analyzed using LinReg software to account for efficiency of amplification and normalized by 3 internal control genes (*HPRT1*, *TBP*, and *YWHAZ*). qRT-PR data were log-transformed and the samples with Studentized residuals $t > 2$ removed. The final data set (82 genes) was subjected to ANOVA analysis with treatment, time, and treatment × time as main effect and animal as random using JMP Genomics of SAS. Significance was deemed with a false discovery rate-adjusted *P*-values < 0.10. Genes coding for chemokine receptors (*CX3CR1, CXCR1*), stress response (*NAMPT*), osteoclastogenesis (*TNFRSF11B*), and angiogenesis (*VEGFA*) were affected by treatment x time. Thirteen genes coding for interleukins and interleukin receptors (*IL1B*, *IL9, IL1RN*, *IL1R1, IL10RB*, *IL10RA*), chemokine ligand and receptors (*CCR2*, *CXCL2, CXCR1, CCL26, CCR1*), macrophage function (*CSF1*), and secondary immune response (*BMP2*) were downregulated and *CCL1* was upregulated by OG supplementation. Of the 23 receptors evaluated, 9 (39%) were influenced by OmniGen supplementation. Overall, the data suggest a transcriptional inhibition of genes related to inflammatory response by OG during the first 28 d of supplementation of healthy Angus heifers.

Key Words: OmniGen-AF, immune, cytokine

M45 Influence of hydrolysable tannin extract on nematode egg count in feces of receiving beef cattle. Melissa B. Corona[1], Eva X. Murillo[1], Billy J. Cervantes[2], Nohemi Castro[1], Javier A. Romo[1], Soila M. Gaxiola[1], and Rubén Barajas*[1], *[1]FMVZ-Universidad Autónoma de Sinaloa, Culiacán, Sinaloa, México, [2]Ganadera Los Migueles, S.A. de C.V., Culiacán, Sinaloa, México.*

The nematode parasites decline productivity of beef cattle. The nematode egg count is decreased in feces of cattle grazing plants with high hydrolysable tannin content. There is little information of effect of added tannins to the diet on nematodes presence in beef cattle. In this experiment 40 receiving bull-calves were involved to determine the influence of hydrolysable tannin extract on nematode egg count in feces of receiving beef cattle. Bull-calves were placed in 8 dirt-floor pens, and during 3 continuous days, fecal samples were taken from each. They were randomly assigned to treatments: (1) 70% roughage (16.1% CP; 1.27 Mcal NE_m/kg DM) corn silage-based diet (Control); (2) Control